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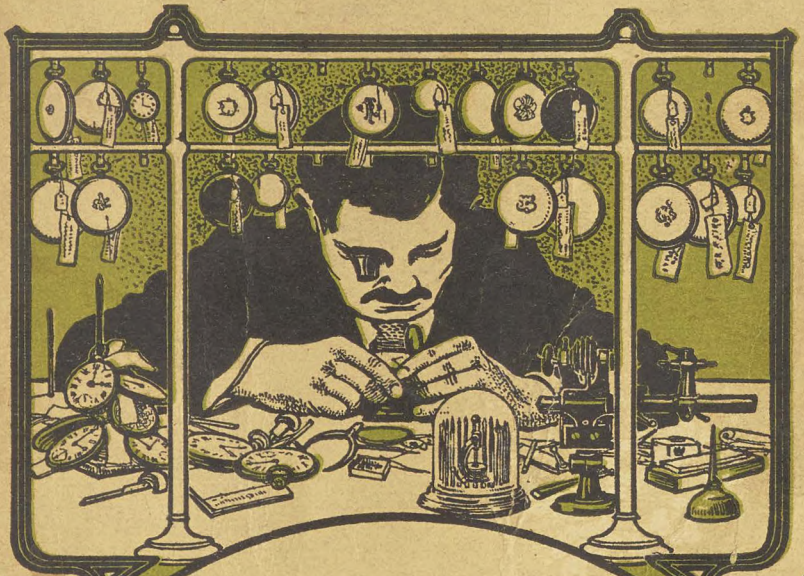

LESSON NO. 2

Rogers, Thurman & Co.

(INCORPORATED)

Jewelers Wholesale
Supply House

CHICAGO, U.S.A.

Cleaning the Watch Movement

LESSON NO. 2

Paragraph No. 1

Using Benzine and Alcohol

¶ Form a piece of brass wire with a hook on one end (See figure 1) and use it as described hereafter. The alcohol cup should be about half full of wood alcohol and the benzine cup half full of benzine. You can purchase wood alcohol and benzine at any drug store. The wood alcohol is poisonous and should be labeled. Number the cups as follows, and keep them in regular order, always in the same position so as to avoid any mistakes. Benzine, Cup No. 1. Alcohol, Cup No. 2. You now proceed as follows: String center wheel, third wheel, fourth wheel, escape wheel, hour wheel and mainspring barrel (See figure No. 2) on the brass hook and dip them in Benzine Cup No. 1. Let the parts soak for two or three minutes, then put them in the saw-dust, which will absorb the benzine. The object of the benzine is to soften the dirt or oil that has accumulated on these parts. The saw-dust and foreign matter is removed from the wheels and pinions with a watch brush, as described in the next paragraph.

Paragraph No. 2

Brushing the Wheels and Cleaning the Pinions

¶ Remove one of the wheels from the brass hook, hold it with a piece of watchmaker's tissue paper in your left hand and the brush in your right hand. Put some chalk

on your watch brush and brush the wheel until all foreign matter has been removed and it is perfectly clean. After all of the wheels have been cleaned, take a piece of pith, from which you have removed the hard outside surface with your bench knife, and clean the pinions. Push them in and out and revolve them in the pith. These parts are now cleaned and ready to be put back into the watch movement and should be placed in a movement tray under a glass cover until wanted. Always use your brush on these parts to remove the pith or any particles of dirt.

Paragraph No. 3

Cleaning the Movement Plates and Removing the Balance Jewels

¶ You now clean the two movement plates (See figure No. 3). There are two small screws that hold the balance jewels in the potance (See figure No. 4). Remove the screws, put them in your screw holder and with jewel pusher No. 3202, remove the balance jewel and cap jewel by pushing them out. The jewel pusher must be pushed through from underneath the movement plate (See figure 5). After the jewels have been removed put movement plates on the brass hook and clean them in the benzine and saw-dust as you did the wheels. After the plates have been cleaned and dried, you polish them by putting chalk on your brush. Brush them very lightly, then take a piece of peg-wood, which you have sharpened with your bench knife No. 2404. The point on the peg-wood must be fine enough to enter the pivot holes in the movement plate. Clean these holes with the peg-wood by pushing the point into them and revolving it a few times. These parts are now cleaned and should be placed with the others in the tray under a glass cover.

Paragraph No. 4

Cleaning Winding Parts and Balance Jewels

¶ You now clean the canon pinion, barrel arbor and all of the winding parts by putting them into benzine cup No. 1. After they have been in this cup for about ten minutes, remove them with tweezers one at a time and dip in the sawdust box to dry, after which they must be cleaned thoroughly with your watch brush. Now put the balance jewel and cap jewel in the bezine cup, remove them one at a time with jewel tweezer No. 5019 and brush thoroughly. Clean the holes with a piece of pointed pegwood and put all of the parts in the glass covered tray after they have been cleaned.

Paragraph No. 5

Cleaning Balance Bridge and Regulator

¶ All of the movement parts have now been cleaned excepting the balance bridge, balance wheel, hairspring, roller table and balance staff. These parts are shown in figure No. 6, and on account of their delicate construction you must handle them very carefully. They are fastened together and it is necessary to separate them to be cleaned. First remove the hairspring, the outer end of which is held in the hairspring stud, by a small screw (simply loosen the screw, do not take it out) and push the hairspring out with pin pusher No. 4209. The balance bridge and balance wheel are now separated. Leave the balance wheel and hairspring in its present condition until you have cleaned the balance bridge. Remove the two screws that are holding the balance jewel and push from underneath with your jewel pusher. The balance jewel and endstone will come out together. (See figure No. 7.) With

your tweezer, you remove the regulator from the balance bridge. After it has been removed, string the regulator and bridge on the brass hook and clean as you did the movement plates, and after they are cleaned, put the balance jewel and cap jewel in the benzine cup. Clean with brush and peg-wood.

Paragraph No. 6

How to Remove and Clean a Hairspring and Roller Table

¶ Before removing the hairspring and roller table, it is necessary to know their exact position on the balance staff, so that when putting the movement together they will occupy the same positions. The hairspring stud is the small attachment fastened on the outer end of the hairspring. (See figure No. 8.) Put the balance wheel on anvil No. 2,000 in the center hole with roller table down. (See figure 9.) Make a little mark on the rim of the balance wheel in line with the hairspring stud. With hairspring Collet Remover No. 3210, remove the hairspring and put it in your benzine cup. You now reverse the balance wheel on the anvil and make another mark on the rim of the wheel in line with the roller jewel. Then remove the roller table with roller remover No. 3911. Put the balance wheel on the wire hook and clean in the benzine, as you did the wheels and plates. Brush lightly with a soft brush to remove the sawdust; clean the pivots with pith and be very careful not to break them. You now take the hairspring from the benzine cup, lay it on a piece of watch makers' tissue paper and let it dry. Do not use a brush on the hairspring. Dip the roller table in the benzine, after which you hold it in your tweezer and clean with brush. After movement parts have been cleaned they should never be touched with the hands, be-

cause the moisture from the fingers will rust them. All of the movement parts have now been cleaned and must be put in the glass-covered movement tray until put together.

Paragraph No. 7

How to Clean the Mainspring

¶ Examine the mainspring very carefully. It must be in perfect condition before it is put back into the mainspring barrel. The spring can be cleaned by dipping it into the benzine cup, after which it should be dried with a piece of watch maker's tissue paper. Do not put the spring in the sawdust. You can also clean the spring with a piece of tissue paper which has been moistened with benzine. Rub the coils until they are clean and bright, but be very careful not to bend them. If the spring is not in perfect condition it must be replaced by a new one.

Paragraph No. 8

¶ Now you must direct your attention to your bench and tools; they must be cleaned and put in order so that you can proceed with the repairing. The movement parts are in your glass covered tray; before taking them out see that all of the particles of sawdust or chalk have been removed from your bench. Have a clean piece of white paper or card board in place and your tools ready to proceed with the work as described in the next lesson.

Special Instruction is Not Necessary for Clock Repairing

¶ I will only give a few instructions pertaining to clock repairing because anyone who follows me through my course of lessons in watch repairing can very easily repair clocks. The principle is exactly the same in a clock. The pendulum performs the same work as a balance wheel in a watch. The other parts are also similar and on account of not being assembled in a compact form they are easier of access. The parts being so much larger enables you to locate and repair the defects without minute inspection. If the following instructions are not adequate I will be pleased to give any further information desired, and hope our students will not hesitate to ask questions.

Charles F. Elmore

Instructor

CLOCK REPAIRING

Paragraph No. 1

Removing Dial and Hands and Letting Down the Mainspring

¶ The clock movement is similar to the watch and consists of the parts as shown on the chart. The chart also tells the names of the different parts mentioned in these instructions. Remove the clock movement from the case with clock screw driver No. 4511, put it on your bench, face up, and remove the hands with your side-cutting plier, then remove the dial which is held in place by pins. It is now necessary to let down the mainspring. The mainspring in a French clock is inclosed in a mainspring barrel. When letting down the spring, proceed as you would with a watch movement. Use patent clock key No. 3300, turn it half way round until the click that holds the mainspring barrel is released, then while holding the key, move the click to one side with your clock screw driver and allow the mainspring to unwind. The mainspring in an American made clock is not inclosed in a mainspring barrel. It is therefore necessary to wrap a strong piece of twine around the spring and tie it securely before it is let down. If this is not done, the spring will open and spread too far. Do not use an ordinary clock key when letting down a clock mainspring. The spring is very powerful. If the key slips from your fingers, the recoil of the spring will break the clock wheels and will also injure your hand.

Paragraph No. 2

How to Take the Movement Apart

¶ Always take a clock apart when it is being cleaned. A clock properly cleaned will run from three to five years without having to be cleaned again. After the mainspring has been let down test the end shake and side shake of the different pinions, examine the verge, see that the lock of the pallet is not too deep on the teeth of the escape wheel. It should be very light. The pallet does not require much slide on the teeth. In an alarm clock, examine the pivot of the balance staff. See that the points are sharp and that the end and side shake is correct. You now remove the verge, then remove the nuts or pins that hold the clock plates together and lift off the plate. Do not bend or injure the teeth of the escape wheels, as it is very hard to repair them. After removing all of the wheels and the mainspring, you are ready to proceed with the cleaning.

Paragraph No. 3

How to Clean the Clock

¶ Wash the two clock plates in hot water with soap. Use clock brush No. 2203. After they are cleaned, pour wood alcohol over them. Then put the plates in box-wood sawdust and keep them moving about until dry. Remove the saw-dust with a stiff watchmakers' brush and brighten the plates by brushing them with chalk. Clean the pivot holes with a piece of pointed peg-wood. Wrap a piece of clean cloth around the peg-wood when cleaning the larger holes. The wheels and the remaining parts should be cleaned in benzine and sawdust and also polished with the brush and chalk.

Paragraph No. 4

How to Bush a Pivot Hole

¶ When a pivot hole becomes worn and enlarged so that the teeth of the wheels do not mesh properly with the leaves of the pinions, the depthing is defective, making it necessary to repair the pivot holes. Proceed as follows: Enlarge the hole with a cutting broach until it is about twice as large as its original size. Then select a piece of seamless bushing wire with a larger diameter than the hole you are about to repair, taper the wire until one end will enter the hole, then cut it off with your saw No. 4701 and fit it into the hole. The piece of bushing wire must be about 1-16 of an inch longer than the thickness of the clock plate as it is held in place by riveting. Place the clock plate on your riveting block or anvil, put the bushing wire in the pivot hole and rivet it in with your watchmaker's hammer and a flat face punch. When it is securely fastened, enlarge the hole with a cutting broach or clock drill until the pivot of the pinion fits properly.

Paragraph No. 5

General Information

¶ Always use the best clock oil and do not use too much. Oil the mainspring, the verge and the bearings of the wheels. If the clock does not strike correctly, the defect is easily remedied, for instance if it strikes nine when the hour hand is at ten, simply move the hand back to nine. The next strike will be ten and the hand will be in proper position. See that the pendulum rod is in good condition. When putting a movement together, have the escapement properly adjusted. The contact of the pallet with the escape wheel must be very light. Oil the ends of the pallet where they come in contact with the teeth of the

escape wheel. If when the clock is level, the beat is not even, bend the verge stem until the defect is remedied. Examine the clock carefully before taking it apart. Notice how the striking parts are placed, if necessary, make a sketch of them, so that when you assemble the movement all the parts will be put back in their original position. When ordering clock material, always send the old part to us to use as a sample and mention the style of clock; also tell us by whom it is manufactured. When putting a movement in the case, see that the hands work properly and do not touch the glass. Always clean the clock case before replacing the movement. You should keep a clock for at least two or three days after it has been repaired, to see that it is regulated and strikes properly. When delivering a clock remove the pendulum or fasten it temporarily with a piece of brass wire to prevent it from being damaged while the clock is being carried. If your work is done in conformity with rules of neatness and skill, the clock will, for all practical purposes, be as good as new.

How to Use Gold, Silver, Steel and Other Hard Solders

¶ A few of our customers have had some trouble in trying to use hard solder. The difficulty with them seems to be in making it flow evenly.

¶ We handle the easiest flowing hard solders made, and if the following directions are carefully followed, there will be no trouble in doing the work successfully.

Directions

¶ See that the joint which is to be soldered is perfectly clean, free from all finger marks, and grease of any kind; scrape, or file, the joint and have it fit snugly together by fastening with binding wire; if you do not use binding wire the joint will open when the heat is applied. Rub some prepared borax (which can be obtained from us) on a borax slate, mix it with water, making a soft paste. Rub this paste on the part to be soldered, then place a small particle of the solder over the joint.

¶ The article that has been prepared in this manner must be heated red hot, before trying to melt the solder, or the solder will gather in a small ball and will not flow evenly or adhere to the joint. Place the article on a charcoal or asbestos soldering block, have the wick of your alcohol lamp pulled out far enough to make a large flame, with the blow-pipe heat the block directly under the article until it becomes red hot. Trying not to touch the solder, or it will harden it. After article is red hot, point the flame directly at the solder, which will flow in a very few seconds, and spread over the joint. After the solder flows plunge the article in cold water at once.

¶ The job must now be finished with a file, after which you restore the color to the gold by using a pickle; the directions for preparing the pickle will be found in our instructions. By polishing with a hand or lathe buff, using rouge, the joint that has been soldered will be made invisible.

¶ It is a good idea to dip an article in water and then cover it with boracic acid powder, that is to be hard soldered, before doing the work, the heat will not discolor the gold if this is done. Also bind it with wet tissue paper, only leaving the part that is to be soldered, exposed to the heat. We have a soldering tool with a cup attachment (called Miller's Soldering Tool) that costs 65c, which is very fine for this purpose. It is necessary to bear in mind that the article has to be red hot before the heat is applied to the solder.

Pickle

¶ A good pickle is prepared by mixing one-eighth of an ounce of sulphuric acid with one ounce of rain water.

Burnishing Powder

¶ A good burnishing powder is prepared from ½ pound white chalk, 2 ounces of pipeclay, 2 ounces white lead, ½ ounce magnesia carbonate, and colored with the same quantity of jeweler's rouge. It is said to be unrivaled for cleaning silver.

Polishing

¶ Be very careful and keep the buffs and polishing tools that are used for different stages of polishing in separate apartments, and do not let them come in contact with one another. When you have used one kind of polishing material, with its necessary tools, put them in their proper

place, and clean the article you are polishing, as well as your hands, before you use the next; and so on, until you have finished. You cannot get a high polish free from scratches, if you do not keep your material, tools and hands in proper condition.

Paste for Cleaning Metals

¶ One part oxalic acid, six parts rotten stone; mix with equal parts of train oil and spirits of turpentine to a paste.

Lustrous Polish for Cabinet Work

¶ A fine, lustrous polish for delicate cabinet work can be made as follows: Half pint linseed oil, half pint of old ale, the white of an egg, one ounce alcohol, one ounce spirits of salts. Shake well before using. A little to be applied to the face of a soft linen pad, and lightly rubbed for a minute or two over the article to be restored, which should first be rubbed off with an old silk handkerchief. It will keep any length of time if well corked.

Polishing Rags

¶ Nothing is better for cleaning silver than the following: Boil one ounce of finely pulverized hartshorn in one quart of water. Leave the vessel on the fire and put all the silverware into it—as much as the water will accommodate; boil for a time, take it out, drip it over the vessel, and let it dry at the fire. Continue until every article has been treated in this manner. Next place clean linen cloths in the water and let them become saturated. When taken out and dried use them for polishing the silver (and these rags are at the same time excellent for cleaning articles of brass—signs, door-knobs, etc.) Rub the ware with the cloth, and finish with soft leather.

Polishing Ivory or Tortoise Shell

¶ A polish on tortoise shell or ivory is produced by rubbing the article with oxide of tin dissolved in water or oil. Rub with a piece of flannel, and gradually work dry.

Rust

¶ Nuts are frequently rusted so tightly upon the screws that the wrench will not loosen them; kerosene or naphtha, turpentine, even, will in a short time penetrate between the nut and stem. Next heat them in a fire, which will quickly sever them. In fact, kerosene is excellent for removing rust. Leave the article for some time in it, and the rust will come off easily.

Another Rust Preventative

¶ Cast iron is best preserved by rubbing it with black-lead. For polished work varnish with wax dissolved in benzine, or add a little olive oil to copal varnish, and thin with spirits of turpentine. To remove deep-seated rust use benzine and polish off with fine emery, or use tripoli, two parts, pulverized sulphur one part. Apply with soft leather. Emery and oil are also very good.

How to Remove a Tight Ring

¶ A novel method of effecting the removal of a ring which has become constricted around a swollen finger, or in any other similar situation, consists simply in enveloping the afflicted member, after the manner of a circular bandage, in a length of flat India rubber braid, such as ladies make use of to keep their hats on the top of their heads. This should be accurately applied, beginning not

close to the ring, but at the tip of the finger, and leaving no intervals between the successive turns, so as to exert its elastic force gradually and gently upon the tissues underneath. When the binding is completed, the hand should be held aloft in a vertical position, and in a few minutes the swelling will be perceptibly diminished. The braid is then taken off and immediately reapplied in the same manner, when, after another five minutes, the finger, if again rapidly uncovered, will be small enough for the ring to be removed with ease.

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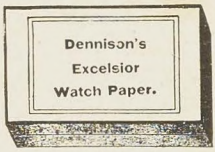

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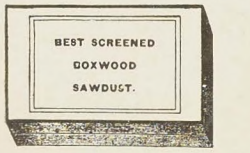

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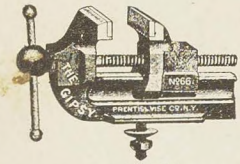

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¶ We will sell any of the articles in this outfit separately at the prices quoted. Lesson No. 2 Outfit contains all of the tools and material necessary for following the instructions in this lesson, providing you have the outfit called for in Lesson No. 1. It is comprised of the following articles:

$5.90 CONTENTS $5.90

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¶ Send us $5.90 and we will send you this outfit by express or send us a deposit of $1.00 and we will ship by express C.O.D. allowing you the privilege of examining the goods before you pay the charges. The deposit you send us will be credited on your bill. If you purchase our outfits as we have them listed, you will receive the benefit of the extra 10% discount from our regular wholesale prices.


R&T